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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/433,705	11/04/1999	SHUNPEI YAMAZAKI	0756-2062	2883

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EXAMINER
LOKE, STEVEN HO YIN

ART UNIT	PAPER NUMBER
2811	

DATE MAILED: 02/12/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 07-01)

Office Action Summary	Application No.	Applicant(s)	
	09/433,705	YAMAZAKI, SHUNPEI	
	Examiner	Art Unit	
	Steven Loke	2811	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 January 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *13-17 and 46-81* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *13-17 and 46-81* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

1. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

2. The disclosure is objected to because of the following informalities:

There is no reference numeral 220 (page 23, line 18) in figs. 12A and 12B.

There are no reference numerals 421 and 422 (page 26, line 16, page 27, line 16) in the figures.

It is believed that regions 316 to 319, 326 and 327 are undoped regions in fig. 12A. It is unclear why regions 316 to 319, 326 and 327 are n^- - type impurity regions (page 26, lines 21-22).

It is believed that regions 334 and 335 are undoped regions in fig. 12A. It is unclear why regions 334 and 335 are n^- - type impurity regions (page 27, line 7).

Appropriate correction is required.

3. Claims 17, 50, 59, 63 and 68 are objected to because of the following informalities: In claims 17, line 3, claim 50, line 3, claim 59, line 3, claim 63, line 3, claim 68, line 3, the phrase "(a goggle-type display)" should not be in parentheses. Appropriate correction is required.

4. Claims 14, 16, 47, 49, 52, 54, 56, 58, 61, 62, 65, 67, 72 and 78 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in

the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The specification discloses an angle (taper angle) between a side of each of the wiring lines 351, 361, and 371 and the gate insulating film 305 is made 20 degrees (page 25, lines 18 and 19) in the pixel and driving portions of the liquid crystal display device. The specification never discloses an angle between the tapered portions of the first conductive layer and the gate insulating film is in a range of 3 to 60 degrees as claimed in claims 14, 47, 52, 56, 61 and 65.

The specification discloses the first conductive layer is made of an n-type silicon film 402 containing phosphorus and the second conductive film is made of a molybdenum-tungsten alloy (Mo-W) 403 (page 25, lines 5-7) in the pixel and driving portions of the liquid crystal display device. The specification never discloses the first conductive layer is made of Cr, Ta, Ti, W or Mo and the second conductive layer is made of Al, Cu, Cr, Ta, Ti, n-type silicon containing phosphorus or silicide as claimed in claims 16, 49, 54, 58, 62 and 67.

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 13, 15-17, 46, 48-51, 53-55, 57-60, 62-64, 66-71, 73, 74 and 81 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakazono et al. (Japanese patent application no. 06-148685) in view of Kurokawa.

In regards to claims 13, 46, 51, 55, 60, 64, 69-71, 73 and 74, Nakazono et al. disclose a semiconductor device in figs. 1-3. It is a liquid crystal display device, comprising: at least one first thin film transistor (TFT) (the TFT on left side of fig. 2) formed over a substrate [1]; a pixel electrode [11] electrically connected to the first thin film transistor; a driver circuit including at least one second thin film transistor (the TFT on right side of fig. 2) formed over the substrate [1] for driving the at least one first thin film transistor, each of the first and second thin film transistors comprising: a semiconductor island [2] on an insulating surface [1]; source and drain regions [7a] formed in the semiconductor island; a channel region [7c] in the semiconductor island between the source and drain regions [7a]; a pair of lightly doped regions [7b] formed between the channel region [7c] and the source and drain regions [7a] wherein an impurity concentration in the lightly doped regions [7b] is smaller than that in the source and drain regions [7a]; a gate electrode [4, 5] formed over the semiconductor island with a gate insulating film [3] interposed therebetween wherein said gate electrode [4, 5] comprises at least a first conductive layer [4] and a second conductive layer [5] formed on the first conductive layer [4].

Nakazono et al. differs from the claimed invention by not showing the first conductive layer having a pair of tapered portions, which extend beyond side edges of the second conductive layer. In addition, the pair of lightly doped regions has a pair of first portions, which are overlapped by the pair of the tapered portions of the first conductive layer, and a pair of second portions, which extend beyond side edges of the first conductive

layer, and the concentration of the impurity in the pair of first portions monotonically increases in a direction from the channel region toward the source and drain regions.

Kurokawa shows a semiconductor device comprising a gate electrode [33] having a first conductive layer [31] having a pair of tapered portions, which extend beyond side edges of the second conductive layer [32] in fig. 2. In addition, a pair of lightly doped regions [25] has a pair of first portions, which are overlapped by the pair of the tapered portions of the first conductive layer [31], and a pair of second portions, which extend beyond side edges of the first conductive layer [31]. It is inherent that the concentration of the impurity in the pair of first portions monotonically increases in a direction from the channel region toward the source and drain regions .

Since both Nakazono et al. and Kurokawa teach an insulated gate electrode having two conductive layers and a pair of lightly doped regions, it would have been obvious to have the gate electrode structure and the lightly doped regions of Kurokawa in Nakazono et al. because they prolong the life of the transistor and restrain the short channel effect.

It is inherent that the semiconductor device is an active matrix display device because it comprises a TFT array.

In regards to claims 15, 48, 53, 57, 66, 81, the combined device further discloses the semiconductor island is a crystalline silicon island.

In regards to claims 16, 49, 54, 58, 62, 67, the combined device further discloses the first conductive layer includes an n-type silicon containing phosphorus and the second conductive layer includes tungsten silicide.

In regards to claims 17, 50, 59, 63, 68, the combined device of Nakazono et al. and Kurokawa further discloses the liquid crystal display can be used in a rear-type projector (a liquid crystal television) (page 5, lines15-18 of the English translation of Nakazono et al.).

7. Claims 14, 47, 52, 56, 61, 65 and 72, are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakazono et al. in view Kurokawa, further in view of Maddox, III.

In regards to claims 14, 47, 52, 56, 61 and 65, Nakazono et al. and Kurokawa differ from the claimed invention by not showing an angle between the tapered portions of the first conductive layer and the gate insulating film is in a range of 3 to 60 degrees.

Maddox, III discloses an angle between the tapered portions of the gate electrode and the gate insulating film is less than 60 degrees in fig. 2.

Since both Kurokawa and Maddox, III teach an insulated gate transistor having a tapered gate electrode, it would have been obvious to have the tapered gate electrode of Maddox, III in Kurokawa because it minimizes the problem of punchthrough in the thin film transistor.

In regards to claim 72, the combined device further discloses the display device is a liquid crystal device.

8. Claims 75-77, 79 and 80 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakazono et al. in view of Kurokawa, further in view of Hamada.

In regards to claims 75-77, 79 and 80, Nakazono et al. and Kurokawa differ from the claimed invention by not showing the active matrix display device is an electroluminescent display device.

Hamada discloses an active matrix display device is an electroluminescent display device [201] in fig. 8.

Since both Nakazono et al. and Hamada teach a display device includes a thin film transistor as a switching element, it would have been obvious to have the electroluminescent display element of Hamada to replace the liquid crystal element of Nakazono et al. because it provides a much clear image than liquid crystal.

9. Claim 78 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nakazono et al. in view Kurokawa, further in view of Maddox, III. and Hamada.

In regards to claim 78, Nakazono et al., Kurokawa and Maddox, III further differ from the claimed invention by not showing the active matrix display device is an electroluminescent display device.

Hamada discloses an active matrix display device is an electroluminescent display device [201] in fig. 8.

Since both Nakazono et al. and Hamada teach a display device includes a thin film transistor as a switching element, it would have been obvious to have the electroluminescent display element of Hamada to replace the liquid crystal element of Nakazono et al. because it provides a much clear image than liquid crystal.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Steven Loke whose telephone number is (703) 308-4920. The examiner can normally be reached on 7:50 am to 5:20 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (703) 308-2772. The fax phone numbers

for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

sl
February 9, 2003

Steven Loke